

I CLAIM:

1. A thermally and electrically conductive apparatus to which one or more electronic devices can be operatively connected, the apparatus comprising:
 - a) a thermally conductive element in thermal contact with the one or more electronic devices; and
 - b) a multilayer coating system including two or more layers, said two or more layers being a sequence of electrically insulating and electrically conductive layers integrally formed on a portion of the thermally conductive element, said electrically conductive layers providing one or more paths for supplying electric current to the one or more electronic devices.
2. The thermally and electrically conductive apparatus according to claim 1, wherein one or more of the layers of the multilayer coating system include circuit traces for connection of the one or more electronic devices thereto, thereby providing a means for controlling the one or more electronic devices individually or in one or more groups of electronic devices.
3. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element is electrically conductive, and thereby capable of providing a path for supplying electric current to the one or more electronic devices.
4. The thermally and electrically conductive apparatus according to claim 1, wherein one or more of the two or more layers of the multilayer coating system are formed by deposition.
5. The thermally and electrically conductive apparatus according to claim 1, wherein the apparatus is coupled to a support structure comprising a circuit carrier.
6. The thermally and electrically conductive apparatus according to claim 5, wherein the multilayer coating system is configured to matingly connect with the circuit carrier, thereby providing one or more electrical connections between the support structure and the thermally and electrically conductive apparatus.

7. The thermally and electrically conductive apparatus according to claim 6, wherein the thermally and electrically conductive apparatus is permanently connected to the support structure.
- 5 8. The thermally and electrically conductive apparatus according to claim 6, wherein the thermally and electrically conductive apparatus is removably connected to the support structure.
9. The thermally and electrically conductive apparatus according to claim 5, wherein
10 the thermally and electrically conductive apparatus is embedded within the support structure.
10. The thermally and electrically conductive apparatus according to claim 5, wherein the support structure includes a heat dissipation system.
- 15 11. The thermally and electrically conductive apparatus according to claim 1, wherein the multilayer coating system is formed on an end of the thermally conductive element.
- 20 12. The thermally and electrically conductive apparatus according to claim 1, wherein the multilayer coating system is formed on a side of the thermally conductive element.
13. The thermally and electrically conductive apparatus according to claim 1, wherein
25 the multilayer coating system sheaths at least a portion of the thermally conductive element.
14. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element is a passive thermal device selected from the group
30 comprising heat pipe, thermosyphon, microchannel cooler and macrochannel cooler.
15. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element is an active thermal device selected from the group comprising thermoelectric cooler, thermionic cooler and forced convection cooler.

16. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element has a shape selected from the group comprising pin, planar element, curved element, cylinder, paraboloid and ellipsoid.

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17. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element has a cross sectional shape selected from the group comprising circular, parabolic, elliptical, prismatic and rectangular.

10 18. The thermally and electrically conductive apparatus according to claim 1, wherein the thermally conductive element has a curvilinear shape.